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Estimates of Required Performance for GUSTO

The calculation of the required performance for GUSTO is a dangerous occupation. It would be difficult even if we knew all the characteristics of all the sets we are facing for so many of the parameters involved in such a calculation are wildly fluctuating statistical factors. When you add to this the tremendous gaps of knowledge on what we face it almost becomes a farce to attempt an estimate. So that no one will be inclined to take the following estimates too seriously I shall attempt to list assumptions and uncertainties as often as possible.

There are two approaches to calculating the required cross section against a given set to reduce the performance of that set to a given level. The straightforward way is to use the radar range equation using the known characteristics of the radar to calculate the required cross section. Unfortunately when you do this and then compare this calculated value with actual flight test results on a radar set maintained and calibrated by laboratory personnel you invariably overestimate the performance of the set in your theoretical calculation. The reasons for this overestimate do not include field degradation since laboratory personnel are maintaining the equipment and measuring the parameters. Nor is operator fatigue and inattention a factor for the operators are told by various means exactly where to look for the radar return. The results are then corrected to represent an operator who has not been told where to look but is attentive. The source of

difficulty seems to be instead that the calculations assume an ideal or optimum detector and the human looking at a PPI is just not an optimum detector by several db. Several attempts to measure the "efficiency" of a human observer have been made but a more common approach in performance estimation uses performance on one set which has had extensive flight testing, this performance is then corrected by the correct ratio of parameters to give the expected performance on the new set. Thus this approach assumes that the same "operator" factor is involved in the two cases. This assumption is a little dangerous in the cases where displays are radically different as for example a PPI in one case and an A scope in the other.

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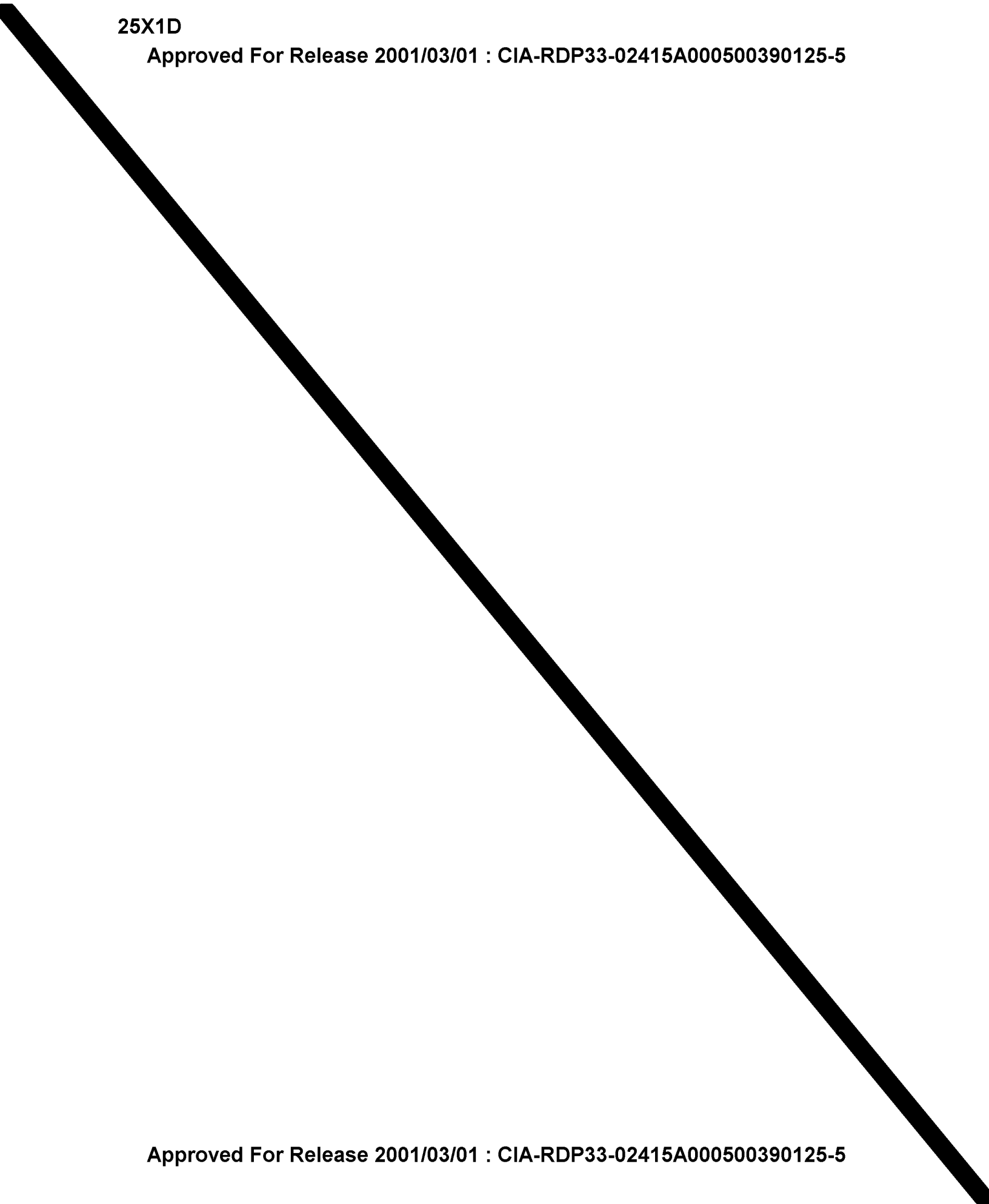

CONCLUSIONS:

I feel that these calculations indicate that we can probably come up with a GUSTO version which could be quite effective against the present equipment. The assumptions I have made in these calculations are in general severe enough that I don't think much improvement in performance of the equipment can be expected unless the basic philosophy of mobile gear is given up. On the other hand I do not feel that we can afford to compromise very much on the performance represented by the Iron Maiden and would therefore recommend serious consideration of a flying wing version with a look at a stabilized mount for the payload.

We should make the following measurements:

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